

ABSTRACT OF THE DISCLOSURE

A 3-D adaptive laser powder fusion welding system provides for both modeling/gauging of a workpiece as well as repair, restoration, and/or manufacture thereof. By providing a work platform and apparatus support system, five degrees of control in the form of two linear axes and three rotational axes are provided. The sixth linear axis is controlled via the displacement of a laser powder fusion (LPF) welding head and a laser rangefinding head. The laser rangefinding head system enables the workpiece **W** to be modeled electronically or otherwise. Additionally, the rangefinding system enables a model part to serve as a template from which repairs or construction are affected. The LPF welding head then affects any repairs or manufacture that are needed on the workpiece **W**. The LPF welding head is powered by filler material. The entire system is generally controlled by computer which enable the operator to be separated from a generally hot and hostile welding environment.

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